

TO THE INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY

Applicant(s) : E.I. DUPONT DE NEMOURS AND COMPANY
International Application No. : PCT/US04/42302
International Filing Date : December 16, 2004
Priority Date Claimed : December 16, 2003
For : HERBICIDAL PYRIMIDINES

The International Preliminary Examination Authority
The European Patent Office
Erhardtstrasse 27
D-80298 Munich 2, Germany

Letter in Support of Amendment Pursuant to PCT Article 34

Dear Ladies and Gentlemen:

The Applicant for the above-identified international application respectfully requests entry of the amendment described herein and embodied in the attached substitute sheets, pursuant to PCT Article 34. This amendment is supplied with the Demand and is therefore timely filed.

Amendments Requested

The amendments requested are:

- a) the substitution of application page 13 filed herewith for application page 13 as originally filed;
- b) the substitution of application page 48 filed herewith for application page 48 as originally filed;
- c) the substitution of application page 58 filed herewith for application page 58 as originally filed;
- d) the substitution of application page 59 filed herewith for application page 59 as originally filed;
- e) the substitution of application page 148 filed herewith for application page 148 as originally filed;
- f) the substitution of application page 149 filed herewith for application page 149 as originally filed;
- g) the addition of pages 150, 151, 152, 153, 154, and 155 to the application.

The nature of the amendments requested are discussed below.

Description of the Amendments Requested

The nature of the amendment contained in substitute page 13 is to substitute the designation R³ with R² in lines 32, 34 and 36 relating to embodiments 9, 10 and 11. This corrects an obvious typographical error as evidenced by the reference to Embodiment 8 (which makes reference to R²) in Embodiment 9, 10 and 11.

The nature of the amendment contained in substitute page 48 is to correct line 1 to include a comma between "MCPA-thioethyl" and "mecoprop" thereby correcting an obvious typographical error. Page 48 is further amended at line 7 to substitute "cumylron" with "cumyluron", thereby correcting an obvious typographical error. Page 48 is further amended at line 7 to substitute "menfenacet" with "mefenacet", thereby correcting an obvious typographical error.

The nature of the amendment contained in substitute page 58 is to correct lines 35, 36, 37 and 38 to correct multiple misspellings of "cumyluron" thereby correcting obvious typographical errors.

The nature of the amendment contained in substitute page 59 is to correct the misspelling of "cumyluron" in line 1 and the misspelling of "mefenacet" in lines 1, 2, 3, 4 and 5 thereby correcting obvious typographical errors.

The nature of the amendment contained in substitute page 148 is to add claims 15, 16, 17 and 18.

The nature of the amendment contained in substitute page 149 is the addition of new claims 19 through 24.

The nature of the amendment contained in new page 150 is the addition of new claims 25 through 31.

The nature of the amendment contained in new page 151 is the addition of new claims 32 through 33.

The nature of the amendment contained in new page 152 is the addition of new claims 34 through 35.

The nature of the amendment contained in new page 153 is the addition of new claims 36 through 40.

The nature of the amendment contained in new page 154 is the addition of new claims 41 through 45.

New page 155 contains the abstract of the disclosure and merely renumbers previous page 149 to page 155.

Support for Amendments to the Specification

All amendments to the specification correct obvious typographical errors and therefore do not go beyond the International Application as filed.

Support for the New and Amended Claims—The following constitutes a non-exhaustive listing of support for the newly presented claims.

New claims 15, 16 and 17 were previously presented via an amendment pursuant to Article 19. Claims 15, 16 and 17 find support in Example 2 beginning on page 29 of the application as originally filed.

New claim 18 finds support at original claim 9 and page 11, lines 3 through 6.

New claim 19 finds support at page 48, line 14 through page 62, line 31.

New claim 20 finds support in the specification as originally filed at page 64 in Index Table A (Compound 8).

New claim 21 finds support in the specification as originally filed at page 64 in Index Table A (Compound 2) and at pages 27 through 28 (Example 1).

New claim 22 finds support in the specification as originally filed at page 65 in Index Table A (Compound 58).

New claim 23 finds support in the specification as originally filed at page 65 in Index Table A (Compound 64) and at page 33 (Example 5).

New claim 24 finds support in the specification as originally filed at page 65 in Index Table A (Compound 65) and at pages 32 through 33 (Example 4).

New claim 25 finds support in the specification as originally filed at page 67 in Index Table A (Compound 135) and at page 29 through 31 (Example 2).

New claim 26 finds support in the specification as originally filed at page 64 in Index Table A (Compound 1) and at pages 27 through 28 (Example 1).

New claim 27 finds support in the specification as originally filed at page 64 in Index Table A (Compound 9) and at pages 31 through 32 (Example 3).

New claim 28 finds support in the specification as originally filed at page 64 in Index Table A (Compound 4).

New claim 29 finds support in original claims 9 and 10 and pages 45-63 of the specification as originally filed. Support is found for example at page 45, line 18 through 23, page 47, line 23 through page 62, line 35 and page 63, line 10 through 26.

New claim 30 finds support in the specification as originally filed as to:

1. amidosulfuron at page 45, line 25, page 48, line 12;
2. azimsulfuron at page 45, line 26, page 47, line 28;
3. bensulfuron-methyl at page 45, line 27, page 47, line 29;
4. bispyribac and bispyribac-sodium at page 45, line 28, page 48, line 9;
5. chlorimuron-ethyl at page 45, line 31, page 47, line 29;
6. chlorsulfuron at page 45, line 32, page 47, line 28;
7. cinosulfuron at page 45, line 33, page 48, line 9;
8. cloransulam-methyl at page 45, line 34;
9. cyclosulfamuron at page 45, line 37, page 48, line 10;
10. diclosulam at page 46, line 4;
11. ethametsulfuron-methyl at page 46, line 8 and page 47, line 29;
12. ethoxysulfuron at page 46, line 8, page 48, line 10;
13. flazasulfuron at page 46, line 10;
14. florasulam at page 46, line 10, page 48, line 12;
15. flucarbazone and flucarbazone-sodium at page 46, line 11, page 48, line 11;
16. flucetosulfuron at page 46, line 11, page 48, line 10;
17. flumetsulam at page 46, line 12, page 47, line 37;
18. fluprysulfuron-methyl and fluprysulfuron-methyl-sodium at page 46, line 13, page 47, line 31;
19. foramsulfuron at page 46, line 15, page 47, line 32;
20. halosulfuron-methyl at page 46, line 18, page 47, line 31;
21. imazamethabenz-methyl at page 46, line 20;
22. imazamox at page 46, line 20, page 48, line 2;
23. imazapic at page 46, line 20;
24. imazapyr at page 46, line 21, page 48, line 2;
25. imazaquin and imazaquin-ammonium at page 46, line 21;
26. imazethapyr at page 46, line 21, page 48, line 2;
27. imazosulfuron at page 46, line 22, page 48, line 10;
28. iodosulfuron-methyl at page 46, line 22, page 47 lines 32 and 33;
29. mesosulfuron-methyl at page 46, line 29, page 47, line 32;
30. metosulam at page 46, line 32, page 48, line 13;
31. metsulfuron-methyl at page 46 line 32, page 47 line 30;
32. nicosulfuron at page 46 line 33, page 47, line 30;
33. oxasulfuron at page 46, line 34;

34. penoxsulam at page 46, line 35, page 47, line 37;
35. primisulfuron-methyl at page 46, line 37, page 47, line 32;
36. propoxycarbazone and propoxycarbazone-sodium at page 47, line 1, page 48, line 11;
37. prosulfuron at page 47, line 2;
38. pyrazosulfuron-ethyl at page 47, line 3, page 48, line 11;
39. pyribenzoxim at page 47, line 3;
40. pyriftalid at page 47, line 4, page 48, line 8;
41. pyriminobac-methyl at page 47, line 4, page 48 lines 8 and 9;
42. pyriproxyfen, pyriproxyfen-sodium at page 47, line 4;
43. rimsulfuron at page 47, line 5, page 47, line 29;
44. sulfometuron-methyl at page 47, line 6, page 47 line 30;
45. sulfosulfuron at page 47, line 7, page 48, line 13;
46. thifensulfuron-methyl at page 47, line 8, page 47, lines 30 and 31;
47. triasulfuron at page 47, line 9, page 48, line 12;
48. tribenuron-methyl at page 47, line 9, page 47, line 30;
49. trifloxsulfuron at page 47, line 11, page 47, line 32;
50. triflusulfuron-methyl page 47, line 11;
51. tritosulfuron at page 47, line 11, page 48, line 12;

New claim 31 finds support for each individual compound as outlined for claim 30 and finds further support at page 45, lines 22 and 23.

New claim 32 finds support in the specification as originally filed as to:

1. amidosulfuron at page 45, line 25, page 48, line 12, page 62, lines 5 through 9;
2. azimsulfuron at page 45, line 26, page 47, line 28, page 48 line 37-38 through page 49, lines 1-2 and Test J beginning on page 138;
3. bensulfuron-methyl at page 45, line 27, page 47, line 29, and page 49, lines 16 through 21;
4. bispyribac and bispyribac-sodium at page 45, line 28, page 48, line 9 and page 60 lines 2 through 6; —
5. chlorsulfuron-ethyl at page 45, line 31, page 47, line 29, and page 49, lines 12 through 16;
6. chlorsulfuron at page 45, line 32, page 47, line 28 and page 49, lines 2 through 6 and Test I beginning on page 136;
7. cinosulfuron at page 45, line 33, page 48, line 9 and page 60, lines 10 through 14;
8. cloransulam-methyl at page 45, line 34;
9. cyclosulfamuron at page 45, line 37, page 48, line 10 and page 60, lines 14 through 18;
10. diclosulam at page 46, line 4;
11. ethametsulfuron-methyl at page 46, line 8 and page 47, line 29;
12. ethoxysulfuron at page 46, line 8, page 48, line 10 and page 60 lines 18 through 22;
13. flazasulfuron at page 46, line 10;
14. florasulam at page 46, line 10, page 48, line 12 and page 61, lines 23 through 26;
15. flucarbazone and flucarbazone-sodium at page 46, line 11, page 48, line 11 and page 61 lines 9 through 13;
16. flucetosulfuron at page 46, line 11, page 48, line 10, page 60 lines 26 through 30;
17. flumetsulam at page 46, line 12, page 47, line 37 and page 54, lines 8 through 12;
18. flupyrsulfuron-methyl and flupyrsulfuron-methyl-sodium at page 46, line 13, page 47, line 31 and page 50, lines 10 through 21;
19. foramsulfuron at page 46, line 15, page 47, line 32 and page 50 line 35 through page 51 line 1;
20. halosulfuron-methyl at page 46, line 18, page 47, line 31 and page 50 lines 21 through 25;
21. imazamethabenz-methyl at page 46, line 20;
22. imazamox at page 46, line 20, page 48, line 2 and page 55 lines 23 through 26;
23. imazapic at page 46, line 20;

24. imazapyr at page 46, line 21, page 48, line 2, and page 55, lines 15 through 19;
25. imazaquin and imazaquin-ammonium at page 46, line 21;
26. imazethapyr at page 46, line 21, page 48, line 2, and page 55, lines 19 through 23;
27. imazosulfuron at page 46, line 22, page 48, line 10, and page 60, lines 30 through 34;
28. iodosulfuron-methyl at page 46, line 22, page 47 lines 32 and 33, page 51, lines 6 through 10;
29. mesosulfuron-methyl at page 46, line 29, page 47, line 32 and page 51, lines 1 through 5;
30. metosulam at page 46, line 32, page 48, line 13 and page 62, lines 9 through 12;
31. metsulfuron-methyl at page 46 line 32, page 47 line 30, page 49, lines 30 through 34 and Test I beginning at page 136;
32. nicosulfuron at page 46 line 33, page 47, line 30, page 49, lines 34 through 38 and Test L beginning at page 142;
33. oxasulfuron at page 46, line 34;
34. penoxsulam at page 46, line 35, page 47, line 37 and page 54, lines 4 through 8;
35. primisulfuron-methyl at page 46, line 37, page 47, line 32 and page 50 lines 25 through 30;
36. propoxycarbazone and propoxycarbazone-sodium at page 47, line 1, page 48, line 11 and page 61 lines 14 through 19;
37. prosulfuron at page 47, line 2;
38. pyrazosulfuron-ethyl at page 47, line 3, page 48, line 11 and page 60, line 38 through page 61 line 5;
39. pyribenzoxim at page 47, line 3;
40. pyriftalid at page 47, line 4, page 48, line 8 and page 59, lines 28 through 31;
41. pyriminobac-methyl at page 47, line 4, page 48 lines 8 and 9 and page 59, lines 31 through 36;
42. pyrithiobac, pyrithiobac-sodium at page 47, line 4;
43. rimsulfuron at page 47, line 5, page 47, line 29, and page 49, lines 21 through 25;
44. sulfometuron-methyl at page 47, line 6, page 47 line 30 and page 49, lines 25 through 29;
45. sulfosulfuron at page 47, line 7, page 48, line 13 and page 62 lines 13 through 17;
46. thifensulfuron-methyl at page 47, line 8, page 47, lines 30 and 31 and page 50, lines 5 through 10;
47. triasulfuron at page 47, line 9, page 48, line 12 and page 61 lines 26 through 30
48. tribenuron-methyl at page 47, line 9, page 47, line 30, and page 49, line 38 through page 50, line 4;
49. trifloxsulfuron at page 47, line 11, page 47, line 32 and page 50 lines 30 through 34;
50. triflusulfuron-methyl page 47, line 11;
51. tritosulfuron at page 47, line 11, page 48, line 12 and page 62, lines 1 through 5;

New claim 33 finds support for each individual compound as outlined for claim 32 and finds further support at page 45, line 22 and 23.

New claim 34 finds support in original claims 9 and 11, page 55, lines 11 through 15, page 62, line 36 through page 63, line 7 and Test H beginning on page 134.

New claim 35 finds support at page 55, lines 11 through 15.

New claim 36 finds support at page 62, line 36 through page 63, line 7 and Test H beginning on page 134.

New claim 37 finds support at original claim 12, as described for new claim 29, and at page 4, lines 18 through 20 and page 40 line 1 through page 44 line 14.

New claim 38 finds support at original claim 12, as described for new claim 34, and at page 4, lines 18 through 20 and page 40 line 1 through page 44 line 15.

New claim 39 finds support as described for new claims 32 and 37.

New claim 40 finds support as described for new claims 33 and 37.

New claim 41 finds support as described for new claim 32, at page 45, lines 22 and 23 and at page 47, lines 15 through 17

New claim 42 finds support as described for new claim 33, at page 45, lines 22 and 23 and at page 47, lines 15 through 17.

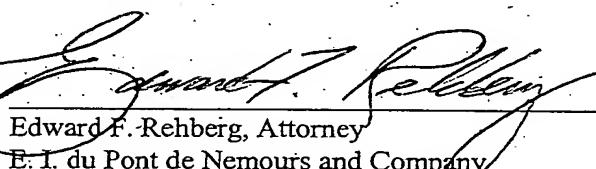
New claim 43 finds support as described for new claim 32 and throughout the specification.

New claim 44 finds support as described for new claim 33 and throughout the specification.

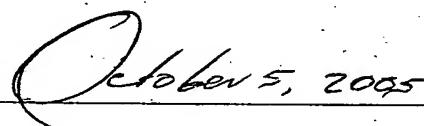
New claim 45 finds support as described for new claim 34 and throughout the specification.

Therefore the additional claims find support in the application as originally filed. Thus, the amendment does not go beyond the disclosure of the application as filed.

Respectfully submitted,


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Date:


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- R⁴⁶ and R⁴⁷ are independently C₁-C₄ alkyl or C₁-C₃ haloalkyl; or
R⁴⁶ and R⁴⁷ are taken together as -CH₂CH₂-, -CH₂CH(CH₃)- or -(CH₂)₃-;
R⁴⁸ is H, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₂-C₄ alkylcarbonyl, C₂-C₄ alkoxy carbonyl
or benzyl;
- 5 R⁴⁹ is H, C₁-C₄ alkyl or C₁-C₄ haloalkyl;
- R⁵⁰, R⁵¹ and R⁵² are H; or a radical selected from C₁-C₁₄ alkyl, C₃-C₁₂ cycloalkyl,
C₄-C₁₂ alkylcycloalkyl, C₄-C₁₂ cycloalkylalkyl, C₂-C₁₄ alkenyl and C₂-C₁₄
alkynyl, each radical optionally substituted with 1-3 R²⁷;
- Y is O, S or NR⁶¹;
- 10 R⁵³ is H, C₁-C₃ alkyl, C₁-C₃ haloalkyl, C₂-C₄ alkoxyalkyl, OH or C₁-C₃ alkoxy;
R⁵⁴ is C₁-C₃ alkyl, C₁-C₃ haloalkyl or C₂-C₄ alkoxyalkyl; or
R⁵³ and R⁵⁴ are taken together as -(CH₂)₂-, -CH₂CH(CH₃)- or -(CH₂)₃-;
R⁵⁵ and R⁵⁶ are independently C₁-C₄ alkyl;
- R⁵⁷ is C₁-C₄ alkyl, C₁-C₃ haloalkyl or NR⁵⁹R⁶⁰;
- 15 each R⁵⁸ is independently selected from H and C₁-C₄ alkyl;
R⁵⁹ and R⁶⁰ are independently H or C₁-C₄ alkyl;
R⁶¹ is H, C₁-C₃ alkyl, C₁-C₃ haloalkyl or C₂-C₄ alkoxyalkyl;
m is an integer from 2 to 3; and
n is an integer from 1 to 4.
- 20 Embodiment 6. A compound of Formula I wherein when R¹ is optionally substituted
cyclopropyl, then R² is other than alkoxyalkyl or alkylthioalkyl.
- Embodiment 7. A compound of Formula I wherein R² is other than alkoxyalkyl or
alkylthioalkyl.
- Embodiment 8. A compound of Embodiment 5 wherein
- 25 R² is CO₂R¹², CH₂OR¹³, CH(OR⁴⁶)(OR⁴⁷), CHO, C(=NOR¹⁴)H, C(=NNR⁴⁸R⁴⁹)H,
(O)_jC(R¹⁵)(R¹⁶)CO₂R¹⁷, C(=O)N(R¹⁸)R¹⁹, C(=S)OR⁵⁰, C(=O)SR⁵¹,
C(=S)SR⁵² or C(=NR⁵³)YR⁵⁴;
- R¹⁷ is C₁-C₁₀ alkyl optionally substituted with 1-3 R²⁹, or benzyl; and
each R²⁹ is independently halogen, C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₁-C₄
30 alkylthio, C₁-C₄ haloalkylthio, amino, C₁-C₄ alkylamino or C₂-C₄
dialkylamino.
- Embodiment 9. A compound of Embodiment 8 wherein when R² is CH₂OR¹³, then R¹³
is other than alkyl.
- Embodiment 10. A compound of Embodiment 8 wherein when R² is CH₂OR¹³, then
35 R¹³ is other than optionally substituted alkyl.
- Embodiment 11. A compound of Embodiment 8 wherein R² is other than CH₂OR¹³.
- Embodiment 12. A compound of Embodiment 8 wherein j is 0.

MCPA-isoctyl, MCPA-thioethyl, mecoprop, clopyralid, aminopyralid, triclopyr, fluroxypyr, diflufenzopyr, imazapyr, imazethapyr, imazamox, picolinafen, oxyfluorfen, oxadiazon, carfentrazone-ethyl, sulfentrazone, flumioxazin, diflufenican, bromoxynil, propanil, thiobencarb, molinate, fluridone, mesotrione, sulcotrione, isoxaflutole, isoxaben, clomazone, 5 anilofos, befubutamid, benfuresate, bentazone, benzobicyclon, benzofenap, bromobutide, butachlor, butamifos, cafenstrole, clomeprop, dimepiperate, dimethametryn, daimuron, esprocarb, etobenzanide, fentrazamid, indanofan, cumyluron, mefenacet, oxaziclofone, oxadiargyl, pentoxyzone, pyraclonil, pyrazolate, pyributicarb, pyriftalid, pyriminobac-methyl, thenylchlor, bispyribac-sodium, clefoxydim, copper sulfate, cinosulfuron, 10 cyclosulfamuron, ethoxysulfuron, epoprodan, flucetosulfuron, imazosulfuron, metamifop, pyrazosulfuron-ethyl, quinclorac, flucarbazone-sodium, propoxycarbazone-sodium, amicarbazone, florasulam, triasulfuron, triaziflam, pinoxaden, tritosulfuron, amidosulfuron, metosulam, sulfosulfuron, pyraflufen-ethyl, HOK-201, KUH-021 and CUH-35. Specifically preferred mixtures (compound numbers refer to compounds in Index Tables A– 15 D) are selected from the group: compound 4 and diuron; compound 9 and diuron; compound 58 and diuron; compound 64 and diuron; compound 65 (and salts thereof) and diuron; compound 94 and diuron; compound 95 (and salts thereof) and diuron; compound 96 and diuron; compound 135 (and salts thereof) and diuron; compound 4 and hexazinone; compound 9 and hexazinone; compound 58 and hexazinone; compound 64 and hexazinone; compound 65 (and salts thereof) and hexazinone; compound 94 and hexazinone; compound 95 (and salts thereof) and hexazinone; compound 96 and hexazinone; compound 135 (and salts thereof) and hexazinone; compound 4 and terbacil; compound 9 and terbacil; compound 58 and terbacil; compound 64 and terbacil; compound 65 (and salts thereof) and terbacil; compound 94 and terbacil; compound 95 (and salts thereof) and terbacil; compound 96 and terbacil; compound 135 (and salts thereof) and terbacil; compound 4 and bromacil; compound 9 and bromacil; compound 58 and bromacil; compound 64 and bromacil; compound 65 (and salts thereof) and bromacil; compound 94 and bromacil; compound 95 (and salts thereof) and bromacil; compound 96 and bromacil; compound 135 (and salts thereof) and bromacil; compound 4 and glyphosate; compound 9 and glyphosate; compound 58 and glyphosate; compound 64 and glyphosate; compound 65 (and salts thereof) and glyphosate; compound 94 and glyphosate; compound 95 (and salts thereof) and glyphosate; compound 96 and glyphosate; compound 135 (and salts thereof) and glyphosate; compound 4 and glufosinate; compound 9 and glufosinate; compound 58 and glufosinate; compound 64 and glufosinate; compound 65 (and salts thereof) and glufosinate; compound 94 and glufosinate; compound 95 (and salts thereof) and glufosinate; compound 96 and glufosinate; compound 135 (and salts thereof) and glufosinate; compound 4 and azimsulfuron; compound 9 and azimsulfuron; compound 58 and azimsulfuron; compound 64 and azimsulfuron; compound 65 (and salts thereof) and azimsulfuron; compound 94 and

(and salts thereof) and butachlor; compound 4 and cafenstrole; compound 9 and cafenstrole; compound 58 and cafenstrole; compound 64 and cafenstrole; compound 65 (and salts thereof) and cafenstrole; compound 94 and cafenstrole; compound 95 (and salts thereof) and cafenstrole; compound 96 and cafenstrole; compound 135 (and salts thereof) and cafenstrole; compound 4 and clomeprop; compound 9 and clomeprop; compound 58 and clomeprop; compound 64 and clomeprop; compound 65 (and salts thereof) and clomeprop; compound 94 and clomeprop; compound 95 (and salts thereof) and clomeprop; compound 96 and clomeprop; compound 135 (and salts thereof) and clomeprop; compound 4 and dimepiperate; compound 9 and dimepiperate; compound 58 and dimepiperate; compound 64 and dimepiperate; compound 65 (and salts thereof) and dimepiperate; compound 94 and dimepiperate; compound 95 (and salts thereof) and dimepiperate; compound 96 and dimepiperate; compound 135 (and salts thereof) and dimepiperate; compound 4 and dimethametryn; compound 9 and dimethametryn; compound 58 and dimethametryn; compound 64 and dimethametryn; compound 65 (and salts thereof) and dimethametryn; compound 94 and dimethametryn; compound 95 (and salts thereof) and dimethametryn; compound 96 and dimethametryn; compound 135 (and salts thereof) and dimethametryn; compound 4 and diamuron; compound 9 and diamuron; compound 58 and diamuron; compound 64 and diamuron; compound 65 (and salts thereof) and diamuron; compound 94 and diamuron; compound 95 (and salts thereof) and diamuron; compound 96 and diamuron; compound 135 (and salts thereof) and diamuron; compound 4 and esprocarb; compound 9 and esprocarb; compound 58 and esprocarb; compound 64 and esprocarb; compound 65 (and salts thereof) and esprocarb; compound 94 and esprocarb; compound 95 (and salts thereof) and esprocarb; compound 96 and esprocarb; compound 135 (and salts thereof) and esprocarb; compound 4 and etobenzanide; compound 9 and etobenzanide; compound 58 and etobenzanide; compound 64 and etobenzanide; compound 65 (and salts thereof) and etobenzanide; compound 94 and etobenzanide; compound 95 (and salts thereof) and etobenzanide; compound 96 and etobenzanide; compound 135 (and salts thereof) and etobenzanide; compound 4 and fentrazamid; compound 9 and fentrazamid; compound 58 and fentrazamid; compound 64 and fentrazamid; compound 65 (and salts thereof) and fentrazamid; compound 94 and fentrazamid; compound 95 (and salts thereof) and fentrazamid; compound 96 and fentrazamid; compound 135 (and salts thereof) and fentrazamid; compound 4 and indanofan; compound 9 and indanofan; compound 58 and indanofan; compound 64 and indanofan; compound 65 (and salts thereof) and indanofan; compound 94 and indanofan; compound 95 (and salts thereof) and indanofan; compound 96 and indanofan; compound 135 (and salts thereof) and indanofan; compound 4 and cumyluron; compound 9 and cumyluron; compound 58 and cumyluron; compound 64 and cumyluron; compound 65 (and salts thereof) and cumyluron; compound 94 and cumyluron; compound 95 (and salts thereof) and cumyluron; compound 96 and cumyluron; compound 135 (and salts thereof)

thereof) and cumyluron; compound 4 and mefenacet; compound 9 and mefenacet; compound 58 and mefenacet; compound 64 and mefenacet; compound 65 (and salts thereof) and mefenacet; compound 94 and mefenacet; compound 95 (and salts thereof) and mefenacet; compound 96 and mefenacet; compound 135 (and salts thereof) and mefenacet; compound 4 and oxaziclofomefone; compound 9 and oxaziclofomefone; compound 58 and oxaziclofomefone; compound 64 and oxaziclofomefone; compound 65 (and salts thereof) and oxaziclofomefone; compound 94 and oxaziclofomefone; compound 95 (and salts thereof) and oxaziclofomefone; compound 96 and oxaziclofomefone; compound 135 (and salts thereof) and oxaziclofomefone; compound 4 and oxadiargyl; compound 9 and oxadiargyl; compound 58 and oxadiargyl; compound 64 and oxadiargyl; compound 65 (and salts thereof) and oxadiargyl; compound 94 and oxadiargyl; compound 95 (and salts thereof) and oxadiargyl; compound 96 and oxadiargyl; compound 135 (and salts thereof) and oxadiargyl; compound 4 and pentozazone; compound 9 and pentozazone; compound 58 and pentozazone; compound 64 and pentozazone; compound 65 (and salts thereof) and pentozazone; compound 94 and pentozazone; compound 95 (and salts thereof) and pentozazone; compound 96 and pentozazone; compound 135 (and salts thereof) and pentozazone; compound 4 and pyraclonil; compound 9 and pyraclonil; compound 58 and pyraclonil; compound 64 and pyraclonil; compound 65 (and salts thereof) and pyraclonil; compound 94 and pyraclonil; compound 95 (and salts thereof) and pyraclonil; compound 96 and pyraclonil; compound 135 (and salts thereof) and pyraclonil; compound 4 and pyrazolate; compound 9 and pyrazolate; compound 58 and pyrazolate; compound 64 and pyrazolate; compound 65 (and salts thereof) and pyrazolate; compound 94 and pyrazolate; compound 95 (and salts thereof) and pyrazolate; compound 96 and pyrazolate; compound 135 (and salts thereof) and pyrazolate; compound 4 and pyributicarb; compound 9 and pyributicarb; compound 58 and pyributicarb; compound 64 and pyributicarb; compound 65 (and salts thereof) and pyributicarb; compound 94 and pyributicarb; compound 95 (and salts thereof) and pyributicarb; compound 96 and pyributicarb; compound 135 (and salts thereof) and pyributicarb; compound 4 and pyriftalid; compound 9 and pyriftalid; compound 58 and pyriftalid; compound 64 and pyriftalid; compound 65 (and salts thereof) and pyriftalid; compound 94 and pyriftalid; compound 95 (and salts thereof) and pyriftalid; compound 96 and pyriftalid; compound 135 (and salts thereof) and pyriftalid; compound 4 and pyriminobac-methyl; compound 9 and pyriminobac-methyl; compound 58 and pyriminobac-methyl; compound 64 and pyriminobac-methyl; compound 65 (and salts thereof) and pyriminobac-methyl; compound 94 and pyriminobac-methyl; compound 95 (and salts thereof) and pyriminobac-methyl; compound 96 and pyriminobac-methyl; compound 135 (and salts thereof) and pyriminobac-methyl; compound 4 and thenylchlor; compound 9 and thenylchlor; compound 58 and thenylchlor; compound 64 and thenylchlor; compound 65 (and salts thereof) and thenylchlor; compound 94 and thenylchlor; compound 95 (and salts thereof) and thenylchlor;

6-amino-5-chloro-2-(4-chlorophenyl)-4-pyrimidinecarboxylic acid,
ethyl 6-amino-2-(4-bromophenyl)-5-chloro-4-pyrimidinecarboxylate,
methyl 6-amino-2-(4-bromophenyl)-5-chloro-4-pyrimidinecarboxylate, and
6-amino-2-(4-bromophenyl)-5-chloro-4-pyrimidinecarboxylic acid.

- 5 10. A herbicidal mixture comprising a herbicidally effective amount of a compound of Claim 1 and an effective amount of at least one additional active ingredient selected from the group consisting of an other herbicide and a herbicide safener.
- 10 11. A herbicidal mixture comprising synergistically effective amounts of a compound of Claim 1 and an auxin transport inhibitor.
- 10 12. A herbicidal composition comprising a herbicidally effective amount of a compound of Claim 1 and at least one of a surfactant, a solid diluent or a liquid diluent.
- 15 13. A method for controlling the growth of undesired vegetation comprising contacting the vegetation or its environment with a herbicidally effective amount of a compound of Claim 1.
- 15 14. A herbicidal composition comprising a herbicidally effective amount of a compound of Claim 1, an effective amount of at least one additional active ingredient selected from the group consisting of an other herbicide and a herbicide safener, and at least one of a surfactant, a solid diluent or a liquid diluent.
- 20 15. A compound which is 2-cyclopropyl-1,6-dihydro-6-oxo-4-pyrimidinecarboxylic acid.
- 20 16. A compound which is 5-chloro-2-cyclopropyl-1,6-dihydro-6-oxo-4-pyrimidinecarboxylic acid.
- 25 17. A compound which is 5,6-dichloro-2-cyclopropyl-4-pyrimidinecarboxylic acid.
- 25 18. The compound of Claim 1 selected from the group consisting of:
methyl 6-amino-5-bromo-2-cyclopropyl-4-pyrimidinecarboxylate,
ethyl 6-amino-5-bromo-2-cyclopropyl-4-pyrimidinecarboxylate,
phenylmethyl 6-amino-5-bromo-2-cyclopropyl-4-pyrimidinecarboxylate,
6-amino-5-bromo-2-cyclopropyl-4-pyrimidinecarboxylic acid monosodium salt,
6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylic acid,
30 methyl 6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylate,
phenylmethyl 6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylate,

6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylic acid monosodium salt,

6-amino-5-bromo-2-cyclopropyl-4-pyrimidinecarboxylic acid,

ethyl 6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylate,

methyl 6-amino-5-chloro-2-(4-chlorophenyl)-4-pyrimidinecarboxylate,

5 ethyl 6-amino-5-chloro-2-(4-chlorophenyl)-4-pyrimidinecarboxylate,

6-amino-5-chloro-2-(4-chlorophenyl)-4-pyrimidinecarboxylic acid,

ethyl 6-amino-2-(4-bromophenyl)-5-chloro-4-pyrimidinecarboxylate,

methyl 6-amino-2-(4-bromophenyl)-5-chloro-4-pyrimidinecarboxylate, and

6-amino-2-(4-bromophenyl)-5-chloro-4-pyrimidinecarboxylic acid.

10 19. The compound of claim 18 selected from the group consisting of:

ethyl 6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylate,

methyl 6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylate,

methyl 6-amino-5-chloro-2-(4-chlorophenyl)-4-pyrimidinecarboxylate,

ethyl 6-amino-5-chloro-2-(4-chlorophenyl)-4-pyrimidinecarboxylate,

15 6-amino-5-chloro-2-(4-chlorophenyl)-4-pyrimidinecarboxylic acid,

ethyl 6-amino-2-(4-bromophenyl)-5-chloro-4-pyrimidinecarboxylate,

6-amino-2-(4-bromophenyl)-5-chloro-4-pyrimidinecarboxylic acid,

methyl 6-amino-2-(4-bromophenyl)-5-chloro-4-pyrimidinecarboxylate, and

6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylic acid.

20 20. A compound of claim 1 which is 6-amino-5-bromo-2-cyclopropyl-4-pyrimidinecarboxylic acid.

21. A compound of claim 1 which is methyl 6-amino-5-bromo-2-cyclopropyl-4-pyrimidinecarboxylate.

22. A compound of claim 1 which is methyl 6-amino-5-chloro-2-(4-chlorophenyl)-4-pyrimidinecarboxylate.

23. A compound of claim 1 which is ethyl 6-amino-5-chloro-2-(4-chlorophenyl)-4-pyrimidinecarboxylate.

24. A compound of claim 1 which is 6-amino-5-chloro-2-(4-chlorophenyl)-4-pyrimidinecarboxylic acid.

25. A compound of claim 1 which is 6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylic acid.

26. A compound of claim 1 which is ethyl 6-amino-5-bromo-2-cyclopropyl-4-pyrimidinecarboxylate.

5 27. A compound of claim 1 which is methyl 6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylate.

28. A compound of claim 1 which is ethyl 6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylate.

29. A herbicidal mixture comprising a herbicidally effective amount of a compound
10 of claims 18 or 19, and an effective amount of at least one additional active ingredient selected from the group consisting of an other herbicide and a herbicide safener.

30. The herbicidal mixture of claim 10 wherein the additional active ingredient is selected from the group consisting of:

amidosulfuron, azimsulfuron, bensulfuron-methyl, bispyribac, bispyribac-sodium,
15 chlorimuron-ethyl, chlorsulfuron, cinosulfuron, cloransulam-methyl, cyclosulfamuron, diclosulam, ethametsulfuron-methyl, ethoxysulfuron, flazasulfuron, florasulam, flucarbazone, flucarbazone-sodium, flucetosulfuron, flumetsulam, flupyrifluron-methyl, flupyrifluron-methyl-sodium, foramsulfuron, halosulfuron-methyl, imazamethabenz-methyl, imazamox, imazapic, imazapyr, imazaquin, imazaquin-ammonium, imazethapyr,
20 imazosulfuron, iodosulfuron-methyl, mesosulfuron-methyl, metosulam, metsulfuron-methyl, nicosulfuron, oxasulfuron, penoxsulam, primisulfuron-methyl, propoxycarbazone, propoxycarbazone-sodium, prosulfuron, pyrazosulfuron-ethyl, pyribenzoxim, pyriflatalid, pyriminobac-methyl, pyriproxyfen, pyriproxyfen-sodium, rimsulfuron, sulfometuron-methyl, sulfosulfuron, thifensulfuron-methyl, triasulfuron, tribenuron-methyl, trifloxysulfuron,
25 triflusulfuron-methyl and tritosulfuron.

31. The herbicidal mixture of claim 30 wherein the additional active ingredient is in combination with at least one other active ingredient to form a combination of active ingredients selected from the group consisting of:

chlorsulfuron and flucarbazone-sodium;

30 chlorsulfuron and sulfometuron-methyl;

flumetsulam, nicosulfuron and rimsulfuron;

mesosulfuron-methyl and iodosulfuron-methyl;

metsulfuron-methyl and chlorsulfuron;

metsulfuron-methyl and sulfometuron-methyl;
metsulfuron-methyl, thifensulfuron-methyl and tribenuron-methyl;
imazapyr and metsulfuron-methyl;
imazapyr, metsulfuron-methyl and sulfometuron-methyl;
5 imazapyr and sulfometuron-methyl;
rimsulfuron and nicosulfuron;
rimsulfuron and thifensulfuron-methyl;
thifensulfuron-methyl and metsulfuron-methyl;
tribenuron-methyl and metsulfuron-methyl;
10 tribenuron-methyl and thifensulfuron-methyl;
bensulfuron-methyl and metsulfuron-methyl; and
metsulfuron-methyl and chlorimuron-ethyl.

32. The herbicidal mixture of claim 29 wherein the additional active ingredient is selected from the group consisting of:

15 amidosulfuron, azimsulfuron, bensulfuron-methyl, bispyribac, bispyribac-sodium, chlorimuron-ethyl, chlorsulfuron, cinosulfuron, cloransulam-methyl, cyclosulfamuron, diclosulam, ethametsulfuron-methyl, ethoxysulfuron, flazasulfuron, florasulam, flucarbazone, flucarbazone-sodium, flucetosulfuron, flumetsulam, flupyrifluron-methyl, flupyrifluron-methyl-sodium, foramsulfuron, halosulfuron-methyl, imazamethabenz-methyl, imazamox, imazapic, imazapyr, imazaquin, imazaquin-ammonium, imazethapyr, 20 imazosulfuron, iodosulfuron-methyl, mesosulfuron-methyl, metosulam, metsulfuron-methyl, nicosulfuron, oxasulfuron, penoxsulam, primisulfuron-methyl, propoxycarbazone, propoxycarbazone-sodium, prosulfuron, pyrazosulfuron-ethyl, pyribenzoxim, pyriflatalid, pyriminobac-methyl, pyriproxyfen, pyriproxyfen-sodium, rimsulfuron, sulfometuron-methyl, 25 sulfosulfuron, thifensulfuron-methyl, triasulfuron, tribenuron-methyl, trifloxysulfuron, triflusulfuron-methyl and tritosulfuron.

33. The herbicidal mixture of claim 32 wherein the additional active ingredient is in combination with at least one other active ingredient to form a combination of active ingredients selected from the group consisting of:

30 chlorsulfuron and flucarbazone-sodium;
chlorsulfuron and sulfometuron-methyl;
flumetsulam, nicosulfuron and rimsulfuron;

- mesosulfuron-methyl and iodosulfuron-methyl;
- metsulfuron-methyl and chlorsulfuron;
- metsulfuron-methyl and sulfometuron-methyl;
- metsulfuron-methyl, thifensulfuron-methyl and tribenuron-methyl;
- 5 imazapyr and metsulfuron-methyl;
- imazapyr, metsulfuron-methyl and sulfometuron-methyl;
- imazapyr and sulfometuron-methyl;
- rimsulfuron and nicosulfuron;
- rimsulfuron and thifensulfuron-methyl;
- 10 thifensulfuron-methyl and metsulfuron-methyl;
- tribenuron-methyl and metsulfuron-methyl;
- tribenuron-methyl and thifensulfuron-methyl;
- bensulfuron-methyl and metsulfuron-methyl; and
- metsulfuron-methyl and chlorimuron-ethyl.
- 15 34. A herbicidal mixture comprising synergistically effective amounts of a compound of either of claims 18 or 19 and an auxin transport inhibitor.
35. The herbicidal mixture of claim 11 wherein the compound is selected from the group consisting of:
- 20 ethyl 6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylate,
- methyl 6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylate,
- methyl 6-amino-5-chloro-2-(4-chlorophenyl)-4-pyrimidinecarboxylate,
- ethyl 6-amino-5-chloro-2-(4-chlorophenyl)-4-pyrimidinecarboxylate,
- 6-amino-5-chloro-2-(4-chlorophenyl)-4-pyrimidinecarboxylic acid,
- ethyl 6-amino-2-(4-bromophenyl)-5-chloro-4-pyrimidinecarboxylate,
- 25 6-amino-2-(4-bromophenyl)-5-chloro-4-pyrimidinecarboxylic acid,
- methyl 6-amino-2-(4-bromophenyl)-5-chloro-4-pyrimidinecarboxylate and
- 6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylic acid, and the auxin transport inhibitor is diflufenzopyr.

36. The herbicidal mixture of claim 11 wherein the compound is ethyl 6-amino-5-bromo-2-cyclopropyl-4-pyrimidinecarboxylate and the auxin transport inhibitor is disflufenzopyr.
37. The herbicidal mixture of claim 29 further comprising at least one of a surfactant, a solid diluent or a liquid diluent.
38. The herbicidal mixture of claim 34 further comprising at least one of a surfactant, a solid diluent or a liquid diluent.
39. The herbicidal mixture of claim 37 wherein the additional active ingredient is selected from the group consisting of:
- 10 amidosulfuron, azimsulfuron, bensulfuron-methyl, bispyribac, bispyribac-sodium, chlorimuron-ethyl, chlorsulfuron, cinosulfuron, cloransulam-methyl, cyclosulfamuron, diclosulam, ethametsulfuron-methyl, ethoxysulfuron, flazasulfuron, florasulam, flucarbazone, flucarbazone-sodium, flucetosulfuron, flumetsulam, flupyrtsulfuron-methyl, flupyrtsulfuron-methyl-sodium, foramsulfuron, halosulfuron-methyl, imazamethabenz-methyl, imazamox, imazapic, imazapyr, imazaquin, imazaquin-ammonium, imazethapyr, imazosulfuron, iodosulfuron-methyl, mesosulfuron-methyl, metosulam, metsulfuron-methyl, nicosulfuron, oxasulfuron, penoxsulam, primisulfuron-methyl, propoxycarbazone, propoxycarbazone-sodium, prosulfuron, pyrazosulfuron-ethyl, pyribenzoxim, pyriftalid, pyriminobac-methyl, pyriproxyfen, pyriproxyfen-sodium, rimsulfuron, sulfometuron-methyl,
- 15 sulfosulfuron, thifensulfuron-methyl, triasulfuron, tribenuron-methyl, trifloxysulfuron, triflusulfuron-methyl and tritosulfuron.
- 20 40. The herbicidal mixture of claim 39 wherein the additional active ingredient is in combination with at least one other active ingredient to form a combination of active ingredients selected from the group consisting of:
- 25 chlorsulfuron and flucarbazone-sodium;
- chlorsulfuron and sulfometuron-methyl;
- flumetsulam, nicosulfuron and rimsulfuron;
- mesosulfuron-methyl and iodosulfuron-methyl;
- metsulfuron-methyl and chlorsulfuron;
- 30 metsulfuron-methyl and sulfometuron-methyl;
- metsulfuron-methyl, thifensulfuron-methyl and tribenuron-methyl;
- imazapyr and metsulfuron-methyl;
- imazapyr, metsulfuron-methyl and sulfometuron-methyl;

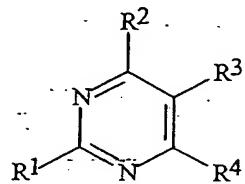
imazapyr and sulfometuron-methyl;
- rimsulfuron and nicosulfuron;
rimsulfuron and thifensulfuron-methyl;
thifensulfuron-methyl and metsulfuron-methyl;
tribenuron-methyl and metsulfuron-methyl;
tribenuron-methyl and thifensulfuron-methyl;
bensulfuron-methyl and metsulfuron-methyl; and
metsulfuron-methyl and chlorimuron-ethyl.

41. The herbicidal mixture of claim 32 wherein the mixture has a greater than additive effect on weeds or a less than additive effect on crops or other desirable plants.
42. The herbicidal mixture of claim 33 wherein the mixture has a greater than additive effect on weeds or a less than additive effect on crops or other desirable plants.
43. A method for controlling the growth of undesired vegetation comprising contacting the vegetation or its environment with the herbicidal mixture of claim 32.
- 15 44. A method for controlling the growth of undesired vegetation comprising contacting the vegetation or its environment with the herbicidal mixture of claim 33.
45. A method for controlling the growth of undesired vegetation comprising contacting the vegetation or its environment with the herbicidal mixture of claim 34.

TITLE
HERBICIDAL PYRIMIDINES

ABSTRACT OF THE DISCLOSURE

Compounds of Formula I, and their N-oxides and agriculturally suitable salts, are
 5 disclosed which are useful for controlling undesired vegetation



I

wherein

R¹ is cyclopropyl optionally substituted with 1-5 R⁵; isopropyl optionally substituted with 1-5 R⁶, or phenyl optionally substituted with 1-3 R⁷;

10 R² is ((O)_jC(R¹⁵)(R¹⁶))_kR;

R is CO₂H or a herbicidally effective derivative of CO₂H;

R³ is halogen, cyano, nitro, OR²⁰, SR²¹ or N(R²²)R²³;

R⁴ is -N(R²⁴)R²⁵ or -NO₂;

j is 0 or 1; and k is 0 or 1; provided that when k is 0, then j is 0;

15 and R⁵, R⁶, R⁷, R¹⁵, R¹⁶, R²⁰, R²¹, R²², R²³, R²⁴ and R²⁵ are as defined in the disclosure.

Also disclosed are compositions comprising the compounds of Formula I and a method for controlling undesired vegetation which involves contacting the vegetation or its environment with an effective amount of a compound of Formula I. Also disclosed are compositions comprising a compound of Formula I and at least one additional active ingredient selected from the group consisting of an other herbicide and a herbicide safener.